N.J. DEPARTMENT OF ENVIRONMENTAL
PROTECTION & ENERGY
Division of Responsible Party Site Remediation

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Jon:

Well its finally here. As we discussed, a hard copy will follow with a memo from Karl to John Frisco. Please note that a 2 or 3 week deadline will be requested. Any questions, please call me ASAP. Thanks.

Christina

346092

Superfund Proposed Plan

L. E. Carpenter & Company

Wharton Borough
Morris County, New Jersey

New Jersey
Department of Environmental Protection and Energy

[enter date]

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the L. E. Carpenter Superfund site and identifies the preferred remedial alternative with the rationale for this preference. The Proposed Plan was developed by the New Jersey Department of Environmental Protection and Energy (NJDEPE), as lead agency, with support from the U.S. Environmental Protection Agency (EPA). The DEPE is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Contingency Plan (NCP). The alternatives summarized here are described in the remedial investigation and feasibility study (RI/FS) report which should be consulted for a more detailed description of all the alternatives.

This Proposed Plan is being provided as a supplement to the RI/FS report to inform the public of DEPE's and EPA's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternative.

The remedy described in this Proposed Plan is the <u>preferred</u> remedy for the site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made, if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after DEPE has taken into consideration all public comments. We are soliciting public comment on all of the alternatives considered in the detailed analysis of the RI/FS because DEPE and EPA may select a remedy other than the preferred remedy.

COMMUNITY ROLE IN SELECTION PROCESS

DEPE and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI/FS report, Proposed Plan, and supporting documentation has been made available to the public for a public comment period which begins on [enter public comment period start date] and concludes on [enter public comment period end date].

A public meeting will be held during the public comment period at the [meeting location] on [meeting date] at [meeting time] to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

All written comments should be addressed to:

George Tomaccio, Community Relations Coordinator
Bureau of Community Relations
NJDEPE
401 East State Street
CN 413
Trenton, NJ 08625-0413

Dates to remember:
MARK YOUR CALENDAR

[enter start and completion dates of public comment period]
Public comment period on RI/FS report, Proposed Plan, and remedies considered

[enter public meeting date]
Public meeting at the [enter meeting location and time]

Copies of the RI/FS report, Proposed Plan, and supporting documentation are available at the following repositories:

[enter address, phone number, and hours of all of the document repositories]

SITE BACKGROUND

The L. E. Carpenter facility is located at 170 North Main Street, Borough of Wharton, Morris County, New Jersey. The site occupies approximately 14.6 acres northwest of the intersection of the Rockaway River and North Main Street. The Rockaway River borders the site to the south; a vacant lot lies to the east; and a large compressed gas facility (Air Products, Inc.) borders the site to the northeast. Additional industrial sites are located to the south of the site. The residential portion of the Borough of Wharton is separated from the site by Ross Street, which is located on the northwestern side of the site.

The site is located within the Dover Mining District. Iron ore was extracted from three mines in the vicinity of the site from the late 1800s to the early 1900s. The Washington Forge Mine and West Mount Pleasant Mine were located directly on what is currently the L. E. Carpenter Property (Sims,1958). The mine was operated intermittently between 1850 and 1910. Several textile businesses were operated at the site prior to 1943 when L. E. Carpenter began operation.

The L. E. Carpenter facility commenced production of Victix vinyl wall coverings from 1943 to 1987. The manufacturing process involved the generation of waste solvents including xylene and methyl ethyl ketone, the collection of solvent fumes via "smog-hog" condensers, the collection of particulate matter via a dust collector, and the discharge of non-contact cooling water to the Rockaway River. During the period of operation, the L. E. Carpenter facility operated several air pollution control devices permitted by NJDEPE and maintained a New Jersey Pollution Discharge Elimination System (NJPDES) Permit for the discharge of non-contact cooling water. From approximately 1963 until 1970, L. E. Carpenter disposed its wastes, including a polyvinyl chloride (PVC) waste material, into an unlined on-site impoundment. These waste impoundments are the main source of soil and groundwater contamination at the site. The site was listed on the National Priority List in April 1985.

L. E. Carpenter submitted a report to NJDEPE dated October 2, 1979, concerning the characterization of the PVC waste material disposed in the impoundment and an evaluation of remedial alternatives. The analysis report of the waste material indicated the presence of the following hazardous substances; di-n-butyl phthalate, diethyl phthalate, phenol, antimony, barium, cadmium copper magnesium, lead and zinc.

NJDEPE conducted soil and groundwater sampling on August 18, 1980 and March 3, 1981. The analytical results of the soil samples indicated the presence of volatile organic compounds, base neutral compounds, metals and polychlorinated biphenyls (PCBs).

NJDEPE also sampled the groundwater monitoring wells located at the site. The analytical results od these samples indicated that the groundwater at the site was contaminated with immiscible (free floating) and dissolved pollutants including; 1,2-dichlorethane, trichloroethylene, toluene, ethylbenzene, styrene, dibromoethane, propyl benzene, xylene, cumene, mesitylene, cymene, tetrachloroethylene, tetrachloroethane, chlorobenzene, copper, lead, arsenic zinc, antimony, barium and nickel.

NJDEPE has overseen site activities at the L. E. Carpenter site since 1982 under various Administrative Consent Orders (ACOs). Current site work is being performed under a September 26, 1986 ACO between NJDEPE and L. E. Carpenter. The Remedial Investigation was initiated in February 1989.

REMEDIAL INVESTIGATION SUMMARY

A summary of the investigation may be found in the Remedial Investigation report dated June 1990, the Supplemental Remedial Investigation Report dated November 1990 and the Final Supplemental Remedial Investigation Report dated September 1992.

Completed Remedial Programs

L. E. Carpenter implemented several remedial programs which addressed sources of contamination discovered during the remedial investigation. In 1982, L. E. Carpenter removed 4,000 cubic yards of sludge and soil from the former surface impoundment. Since May 1984, more than 5000 gallons of floating product has been recovered from a series of recovery wells located primarily on the eastern side of the site. In 1991, the existing groundwater recovery system was upgraded and three additional recovery wells were installed in order to enhance the removal of the immiscible product. This passive system is currently being upgraded again to maximize its recovery. In 1989, an extensive asbestos removal was completed in Buildings 12, 13, and 14. All underground and inactive aboveground storage tanks were decommissioned and removed from the facility in 1990 and 1991 pursuant to procedures established by the NJDEPE Bureau of Underground Storage Tanks under an approved tank closure plan.

All drummed raw materials has been removed from the site. In September 1991, the interior of Building 9 and process piping, tanks and appurtenances in Building 13 were decontaminated. Excess material and wastes were disposed of off-site. In December 1991, Building 12 (former boiler house), 13 and 14 were razed.

Findings of the Remedial Investigation

SOIL

To facilitate remedial investigations, the site was divided into three areas of study based upon former operations in the different areas, specifically Area I, Area II, and Area III.

Area I is bounded by former Buildings 12, 13, and 14 and extends northeast along the railroad ROW to the property near MW-13, extends approximately 300 feet, encompasses the Air Products property near MW-13, extends approximately 500 feet into the Wharton Enterprises property to encompass the abandoned sewer line, and along the Rockaway River to the steel penstock. Shallow soil samples were collected in approximately 26 locations. Deep soil samples were collected from a depth immediately above groundwater (2 to 8 feet BGS) at 63 locations.

Shallow soils indicate levels of DEHP at concentrations up to 15,000 ppm. Three surface soil samples collected at the Wharton Enterprises property indicated levels of PCBs at 45 ppm. Metals, specifically antimony and lead, were detected at the southeast perimeter of former building 13 and south of monitor well MW-9 at concentrations up to 413 ppm and 2230 ppm respectively.

Analysis of deep soil samples indicate levels of DEHP in concentrations up to 30,000 ppm in the area the extending from former Buildings 13 and 14 in the west to the terminus of the abandoned sewer line in the east, and from the drainage ditch in the north to the Rockaway River in the south. VOCs, namely xylene at levels up to 460 ppm, and ethylbenzene up to 43 ppm were also detected. Lead and Antimony were detected at concentrations of 765 ppm and 423 ppm respectively.

Area II encompasses the western edge of Building 15 to the western edge of former Buildings 13 and 14 and the northern edge of Building 15 to the Rockaway River. A total of nine (9) shallow soil samples and four (4) deep (directly above the water table) were collected. Results indicate no contamination above the NJ soil criteria. However, one soil sample indicated the presence of lead at a concentration of 2230 ppm.

Area III encompasses Buildings 8, 9 and 2, which border Ross Street and the Washington Forge Pond. A total of 18 shallow and 21 deep soil samples were collected. Area III soils investigation indicated elevated levels of BNs, mainly DEHP, at concentrations at 6,302 ppm west of Building 8. Soil sampling results indicated concentrations of PCB from ND to 2.9 ppm in the starch drying bed area at the northern portion of the site. Elevated levels of Antimony were found at a concentration of 828 ppm adjacent to the loading dock at Building #9.

GROUND WATER

Results of the ground water investigation at the site has determined that the extent of contamination is located in Areas I and II and restricted to the shallow aquifer which flows in a northeasterly direction, towards the Air Products drainage ditch. Ground water contamination exists in both a floating product and dissolved phase and has migrated onto the neighboring property, Wharton Enterprises. The predominant volatile organic chemicals are xylene at levels up to 150,000 ppb, ethylbenzene at levels up to 26,000 ppb. The predominant base neutral is DEHP in concentrations from ND to 62,000 ppb. The existing floating product is being reduced using an onsite passive recovery system. Metals, such as Arsenic and Antimony were detected in some of the ground water samples at concentrations up to an estimated concentration of 54.9 ppb and 540 ppb respectively.

ROCKAWAY RIVER AND AIR PRODUCTS DITCH

As part of the Remedial Investigation, surface water and sediment samples were taken to determine possible site impacts on the Rockaway River and sediments located adjacent to the river and the Air Products drainage ditch.

Air Products Drainage Ditch

The Air Products Drainage Ditch borders the L. E. Carpenter property on the north eastern portion of the property. The standing water located within the ditch eventually leads into the Rockaway River. Sediment sample results indicate detectable levels of Total Base Neutrals (BNs) and Metals. The predominant BN was DEHP found in concentrations from ND to 520 ppm. The predominant Metals were arsenic at concentrations up to 25.7 ppm, chromium at concentrations up to 34.7 ppm, lead at concentrations up to 503 ppm, mercury at concentration up to 21 ppm, and zinc at concentrations up to 336 ppm. Surface Water samples indicate elevated levels of Volatile Organic Compounds. The predominant volatile organic compound was xylene at a detected concentration of 44 ppb.

Rockaway River

The Rockaway River borders the site from the south western portion of the site up through the eastern portion. Sediment sampling results indicate elevated levels of Total Base Neutrals and Metals in samples on the eastern portion of the site. The predominant BNs was DEHP found in concentrations from 2.6 ppm to 76 ppm. The predominant metals were antimony at concentrations up to 718 ppm, copper at concentrations up to 711 ppm and lead at concentration up to 339 ppm. Surface water samples indicated volatile organics, base neutrals were at trace levels except DEHP, which indicated a concentration of 7.25 ppb. Samples also indicated Lead at a concentration of 20.7 ppb.

SUMMARY OF SITE RISK

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the potential human health and ecological risk which could result from the contamination at the site if no remedial action were taken. Site risk is expressed in exponential terms when estimating the cancer risk such as 1×10^{-6} which means that one person in a million (1,000,000) is at risk of developing cancer.

Human Health Risk Assessment

The reasonable maximum human exposure is evaluated. A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*-- summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess cancer risk) assessment of site-related risks.

The baseline risk assessment selected site related contaminants of concern based on frequency of detection, toxicity and comparison to background levels. These contaminants included DEHP, antimony, PCBs, methylene chloride, benzene, ethylbenzene, PAHs, chromium (hexavalent), arsenic, 1,1-dichloroethane, 1,1-dichlorethene, tetrachloroethene, tricholoroethene, xylene, arsenic, lead, nickel. All of the above contaminants, except lead, antimony, ethylbenzene, xylene, chromium, and nickel are known to cause cancer in laboratory animals and are suspected to be human carcinogens.

The baseline risk assessment evaluated the health effects which could result from exposure to contamination if no action is taken to remediate sources of contamination as a result of:

* the ingestion, inhalation and dermal contact with surface soil;
* ingestion, inhalation and dermal contact with groundwater
* incidental ingestion and dermal contact with stream sediments;
* incidental ingestion and dermal contact with surface water; and
* the ingestion of contaminated animals (fish) from the Rockaway River.

Ground water is not currently used as a potable source at or within a 1 mile radius of the site. Therefore, human health risks associated with ingestion, inhalation and dermal contact with ground water represents the hypothetical future use by a resident living on or directly adjacent to the site. (see Table 1 and Table 2 attached)

Summary of Health Risks

Through an assessment of exposure pathways for the contaminants of concern, specific health risks levels were calculated for each potential significant exposure pathway to enable a quantitative evaluation of potential health risks for human receptors. The quantitative health risk evaluation identified the following potential health risk for each media:

SOIL

A cancer risk of 8.2×10^{-4} was established for an on-site employee; a cancer risk of 2.6×10^{-6} for a trespasser; and a cancer risk of 1.9×10^{-3} for a hypothetical future resident who is exposed to soil via incidental ingestion, inhalation and dermal contact. The Hazard Index which reflects non carcinogenic effects for a human receptor was estimated to be 1.1 for an on-site employee, 2.1 for a trespasser, and 79 for a future resident.

GROUND WATER

A cancer risk was established for a hypothetical future resident for the ingestion, inhalation, and dermal contact with ground water from the shallow, intermediate and deep zones. The risks calculated are 4×10^{-4}; 1.3×10^{-4}; 4.0×10^{-4}; for shallow, intermediate and deep groundwater respectively. The Hazard Index which reflects non-carcinogenic effects for the hypothetical future resident which ingests, inhales or has dermal contact with the ground water, was estimated to be 413 for shallow groundwater, 4.4 for intermediate groundwater and 6.2 for deep ground water. The carcinogenic and non carcinogenic risk for both intermediate and deep ground water have been determined to be an over estimation of the true conditions of the site because DEHP was only found to minimally exceed the Ground Water Quality Standards in one well in each aquifer.

In the intermediate ground water, DEHP and arsenic exceeded the 10^{-6} carcinogenic risk levels and exceeded a HI of 1.0. DEHP was detected in one well above the Ground Water Quality Standard. Arsenic was detected in 1 of 14 samples below the Ground Water Quality Standard.

In the deep ground water, DEHP and 1,2-dichloroethane (1,2-DCA) exceeded carcinogenic risk levels and/or a HI of 1.0. Each compound was detected in only 1 of 10 samples. 1,2-

DCA was detected as an estimated value and is below the Ground Water Quality Standard. The DEHP concentration has only been reported in one deep well in the area were groundwater contamination is the highest. Since the levels are not an order of magnitude higher than the Ground Water Quality Standard and have only been detected in one well, deep ground water does not warrant remediation.

RIVER SEDIMENTS

A cancer risk of 7.9 x 10^{-6} was established for a wader/swimmer who incidently ingests river sediments or through dermal contact. The Hazard Index which reflects non-carcinogenic effects for a human receptor was estimated to be 0.32. The sediment samples taken at the Air Products drainage ditch were not included in this evaluation. The assessment determined that the ditch is inaccessible to the trespasser and too shallow to be used for wading and swimming. Therefore, the potential risk due to exposure to these sediments are negligible.

RIVER SURFACE WATER AND FISH INGESTION

A cancer risk of 2.1 x 10^{-7} was established for ingestion and dermal contact of River Surface water. The Hazard Index which reflects non-carcinogenic effects for a human receptor was 0.013.

A cancer risk of 6.3 x 10^{-4} for ingestion of fish was developed. The Hazard Index which reflects non-carcinogenic effects for a human receptor was estimated to be 1.6. However, the only contaminant exceeding the 95% limit risk and the HI of 1.0 due to consumption of fish from the Rockaway River was arsenic. Arsenic was detected in two of four of the surface water samples from the Rockaway River at an estimated value. These estimated (J) values were used in the baseline risk assessment. This approach results in a conservative overestimation of risk. Based on available information and the conservative evaluation, control of fish ingestion does not appear to be warranted.

These calculated health risks represent a reasonable maximum exposure which represent a summation of the chemical-specific risks associated with each medium being evaluated. USEPA has established a carcinogenic risk range for cleanup of contaminated sites of 1 x 10^{-4} to 1 x 10^{-6} excess cancer risk and greater than 1.0 for non-carcinogenic risks. The Industrial Site Recovery Act (N.J. P.L. 1993 C193) requires that any proposed remedy must meet the cleanup criteria of 1 x 10^{-6}. The more conservative 1 x10^{-6} is used for achieving final remediation.

Based on the scenarios presented, the contaminants identified in soil and shallow ground water exceed the acceptable risk established by NJDEPE of 1 x 10^{-6} and the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} for carcinogenic risk and the Hazard Index of 1.0. Other scenarios that exceed the hazard index; fish ingestion, intermediate and deep ground water, but need not be remediated based on NJDEPE evaluation. The levels of lead in soil that exceed the NJ Soil Criteria are considered to constitute a potential concern at the L. E. Carpenter site. The NJ Soil Criteria are health based remediation goals designed to provide for the protection of human health and the environment across the state.

Actual or threatened releases of hazardous substances from this site, if not addressed by the proposed alternative may present a current or potential threat to public health, welfare or the environment.

Based on the site specific Risk Assessment the NJ Soil Criteria and the ground water Quality Standards the Department has determined that the following media and contaminants at the L. E. Carpenter site need to be addressed:

* Contaminated soil and ground water - DEHP
* Soil hotspot areas - PCB, Lead and Antimony
* Contaminated groundwater - Xylene, Ethylbenzene, DEHP

<u>Ecological Risk Assessment</u>

The purpose of the ecological assessment is to identify and estimate the potential ecological impacts from the release of contaminants on the aquatic resources in the Rockaway River, which is adjacent to the site.

The technical guidance for the performance of this risk assessment comes from several sources, including the *Endangerments Assessment Handbook* (EPA, 1986a); *Ecological Risk Assessment* (Urban and Cook, 1986); and the *Interim Final Risk Assessment Guidance for Superfund: Volume II Environmental Evaluation Manual* (EPA, 1989b).

The ecological risk assessment focused on the real and potential impacts that site related contamination may have on the aquatic resources of the Rockaway River. The ecological assessment evaluation whether aquatic organism were potentially adversely exposed to contaminants at concentrations in the sediments based on the National Oceanic and Atmospheric Administration (NOAA) sediment derived contaminate data. Comparison of surface water contaminant concentrations in the Rockaway to the Ambient water quality criteria (AWQC) indicated the contaminant levels that would likely pose a threat to aquatic life. Due to the uncertainties associated with the use of biological effects associated with the results of the risk assessment, L. E. Carpenter a community level biological assessment of sediment in the Rockaway River, specifically evaluating if present site conditions are impacting the benthic macroinvertebrate community of the Rockaway River. The assessment concluded that historical operations on-site and current conditions of the site do not appear to be impacting the biological community in the sediment or aquatic species of the Rockaway River.

SCOPE AND ROLE OF ACTION

This proposed plan will address all contaminated media determined to pose a threat to human health and the environment at the L. E. Carpenter site. The overall site remediation has been developed in a phased approach to reduce the contaminant migration pathways and minimize exposure. The following media will be addressed in the remedial action:

* Soil, Groundwater - DEHP
* Soil (hot spots) - Lead, Antimony, PCBs
* Groundwater - Xylene, Ethylbenzene, DEHP

L. E. Carpenter has performed an initial removal action of contaminated soils from the sludge impoundment area as well as removed numerous underground storage tanks. The floating product on the ground water is being addressed by use of a passive recovery system which has been upgraded twice since original startup in 1982.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

The following remedial action objectives were established:

Soil Contaminant	Remediation Goal, ppm
DEHP	100
Xylene	10
Ethylbenzene	100
Lead	600
Antimony	340
PCBs	2
PCBs	.45 (Wharton Enterprise)

Ground water Contaminant	Remediation Goal, ppb
DEHP	30
Xylene	40
Ethylbenzene	700
Antimony	20
Arsenic	8

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statue includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The Feasibility Study (FS) report includes a preliminary screening of all potentially applicable technologies, followed by elimination of inappropriate or infeasible alternatives and identification of applicable technologies based solely on technical considerations. The resultant technologies are then developed into remedial alternatives. The FS report evaluated in detail six remedial alternatives for addressing the contamination associated with the L. E. Carpenter site.

The alternatives are:

1. No Action
2. Institutional Controls
3. Containment
4. Treating Contaminated Ground water with Reinfiltration
5. Excavation of Soil/On-Site Washing/Bioslurry Treatment
6. Excavation of Soil/Thermal Treatment

The following is a descriptive analysis of each evaluated alternative:

These alternatives are:

Alternative 1: No Action

Capital Cost: $0.00
O & M Cost: $79,000
Present Worth Cost: $1,215,000
Time to Implement: immediate

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison of other alternatives. Under the no action alternative, no additional remedial actions would be initiated beyond passive recovery of the floating product as specified in the 1986 Amended ACO. The no action alternative would be appropriate if the potential endangerment is negligible or if implementation of a remedial action would result in a greater potential risk. Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the waste.

Alternative #2: Institutional Controls

Capital Cost: $50,000
O & M Cost: $90,000/year
Present Worth Cost: $1,434,000
Time to Implement: immediate

The alternative involves property deed notation and environmental use restriction; ground water use restriction; an expanded ground water monitoring program; maintenance of existing site fencing and; continuation of passive recovery of floating product. The deed notations would be written to restrict future use of the property to non-residential use due to the presence of contaminants above DEPE's residential standards. Ground water restriction involve designation of local ground water sources as nonpotable with delineation of a corresponding well restriction area. The expanded monitoring program requires installation and quarterly sampling of a sentinel well on the Air Products property. Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the waste.

Alternative #3: Containment

Capital Cost: $ 5,716,000
O & M Cost: $ 205,000/year
Present Worth Cost: $ 8,944,000
Time to Implement: 30 months

This alternative involves the following remedial actions; soil cover for DEHP contaminated soil; spot excavation and offsite disposal of isolated metal contaminated surficial soil; active immiscible product recovery; biological treatment of ground water. A soil cover would be designed to allow infiltration into the vadose zone soils to allow natural attenuation of soil contaminants to continue. The cover would mitigate the threat of direct contact, ingestion, inhalation or erosion of soil contaminants. Hot spot excavation and off-site disposal of metal and PCB contaminated soil would be performed. Contaminated soil which exceed land disposal requirements (LDRs) designated for off-site disposal would be treated prior to disposal. Ground water will be extracted then treated by an above ground biological treatment system with a portion of it recirculated with in a capture zone. Remaining treated ground water will be discharged into a deeper aquifer. Such treatment will occur after all immiscible product has been removed by an active recovery system. Biodegradation is an innovative technology which utilizes indigenous bacteria which are capable of metabolizing organic contaminants and DEHP. The biological treatment system would include equalization/nutrient mix tank, bioreactor vessel, effluent "polishing treatment, and vapor phase granular activated carbon (GAC) treatment for volatile organics. Appropriate ground water discharge permits and air permit for the treatment system would be obtained. Institutional controls would be required because this alternative may result in contaminants remaining on-site. CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the waste.

Alternative #4: Treated Groundwater with Reinfiltration/ Soil Biodegradation

Capital Cost: $8,452,000
O & M Cost: $210,000
Present Worth Cost: $11, 028,000
Time to Implement: 36 months

Alternative 4 consists of extraction of contaminated ground water, above ground enhanced biological treatment of the extracted ground water and addition of oxygen and nutrients and possibly a surfactant prior reinfiltration of ground water to the shallow aquifer zone within a treatment basin. Biological treatment will occur after all immiscible product has been removed through a active removal system. A portion of the treated ground water will be recycled within a capture system for the purpose of flushing and stimulating in situ biological activities of the soils. A portion of the ground water will be recirculated within a capture zone in order to create the hydraulic gradients necessary to assure capture. A small portion of treated effluent will be discharged into a deeper aquifer. Final treated ground water will be discharged into a deeper aquifer outside of the treatment zone. Appropriate ground water discharge permits and air permit for the treatment system would be obtained. As with Alternative 3, hotspot excavation and disposal of isolated soils located outside the treatment zone would be performed. Soils to be disposed of off-site would meet all applicable RCRA treatment and disposal criteria. Institutional controls would be required because this alternative may result in contaminants remaining on-site. CERCLA also requires that the site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the waste.

Alternative 5: Excavation/On-site Soil Washing/Bioslurry Treatment/ Treatment of Ground water

Capital Costs: $ 32,191,000
O & M Cost: $ 205,000
Present Worth: $34,681,000
Time to Implement: 38 months

Alternative 5 consists of excavation of contaminated soil, on-site soil washing of excavated soils; and placement of the cleaned soil back on-site; treatment of ground water through above ground biological treatment after immiscible product has been removed through active recovery system as explained in Alternative 3. The soil will be treated in a bioslurry reactor to destroy the organic contaminants. The scrubbing action of the soil washing technology would remove any leachable metal contained in the soils. Process wash water will be treated prior to recycling in the soil washer. Soil excavation and off-site disposal of isolated hot spot areas would still be required under this alternative. On site treated waste would be subject to land disposal restrictions (LDRs). Applicable water, air and wetlands permits would be required. Institutional controls would be required because this alternative may result in contaminants remaining on-site. All ground water process treatments described in Alternative 3 are included in this alternative. CERCLA requires that the site be reviewed every five years. If justified by the review, additional remedial actions may be implemented to remove or treat residual contamination.

Alternative #6: Soil Excavation/Thermal Treatment/ Treatment of Groundwater

OPTION A
Capital Cost: $43,991,000
O & M Cost: $205,000
Present Worth Cost: $46,481,000
Time to Implement: 44 months

OPTION B
Capital Cost: $85,140,000
O & M Cost:$205,000
Present Worth Cost: $87,630,000
Time to Implement: 30 months

Alternative 6 consists of excavation of organic contaminated soils greater than remedial goals and destruction of the organic constituents via incineration. Under this alternative, two options (A and B) are considered. Option A provides for on-site rotary kiln incineration to thermally treat the contaminated soils. Option B, all soils are transported off-site to a commercial RCRA permitted incinerator for treatment. Option A allows for potential backfilling of the excavation with stabilized incinerator ash. Option B allows the excavated area to be backfilled with clean fill. Isolated hot spot soil areas contaminated with metals or PCBs will be disposed of off-site. Under either option, treatment of soils must meet LDR for off or on site disposal. Option A requires various state permits for water, air, and wetlands disturbance. Option B would require meeting Federal DOT transportation and RCRA requirements. All ground water process treatments described in Alternative 3 are included in this Alternative. Institutional controls would be required because this alternative may result in contaminants remaining on-site. CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the waste.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against the nine evaluation criteria. Overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

o Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

o Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

o Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

o Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies a remedy may employ.

o Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

o Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

o Cost includes estimated capital and operation and maintenance costs, and net present worth costs.

o EPA acceptance indicates whether, based on its review of the RI/FS reports and Proposed Plan, the EPA concurs, opposes, or has no comment on the preferred alternative at the present time.

o Community acceptance will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI/FS reports and the Proposed Plan.

A comparative analysis of the alternatives based upon the evaluation criteria noted above follows:.

o Overall Protection of Human Health and the Environment

Alternative #1, no action, would not be protective of human health and the environment. Current levels of DEHP and PCBs in the soil and DEHP, xylene and ethylbenzene in ground water pose an unacceptable risk. By restricting access and ground water usage, Alternative #2 provides greater protection, but not to the future on-site worker and potential contact with contaminated soil. In addition, the potential for off-site migration of contaminated ground water is likely. Alternative #3 through #6 involve ground water treatment and reduction of soils contamination. Alternative #3 and #4 preclude direct contact with surface soils through the installation of a soil cover. In Alternatives #5 and #6, contaminated soil is excavated and treated either on-site or off-site. The flushing of soil via ground water extraction will aid in the removal of soil contaminants in the saturated zone. Should institutional and engineering controls be implemented, then Alternative 3 through 6 are equally protective of human health and the environment.

o Compliance with ARARs

Alternatives #1 and #2 would not meet the 1 x 10^{-6} NJ remediation standard at the L. E. Carpenter site nor the NJ Ground water Quality standards. Alternatives #3 through #6 employ bioremediation for ground water treatment. Bioremediation of target organic compounds will attain ARARs. Under Alternative 3, soils containing DEHP in excess of the remediation goals for a period subject to natural attenuation. In situ bioremediation is effective for treating organic contaminated soils under Alternative #4. Alternatives #5 and #6 should meet remediation goals. All alternatives would meet the air requirements

o Long-Term Effectiveness and Permanence

Alternatives #1 and #2 offer limited long-term effectiveness. The potential of migration of contaminated ground water in addition to not meeting the remediation goals exist at the site. Alternatives 3 through 6 offer effectiveness through the ground water treatment component. Bioremediation and soil flushing contaminates in ground water and soil will be effective at the L. E. Carpenter site. Alternative #3 can provide long term effectiveness as long as the soil cover was properly maintained and institutional controls are in place. However, the DEHP contaminated soils may warrant a five year review. Alternatives #4 through #6 permanently remove contaminants form the soil.

o Cost

Alternative #1's present worth cost is approximately $1.2 M. The primary component would be to maintain the passive recovery system until all immiscible product had been removed. Alternative #2's present worth cast is approximately $1.4 M. The primary component would be to maintain institutional controls, passive recovery system and ground water monitoring program. Alternative #3's present worth cost is $9.5 M. The primary components are hotspot removal, maintenance of soil cover, institutional controls and ground water remediation using bioremediation. Alternative #4's present worth cost is $11.8 M. The primary components are hotspot removal, bioremediation of ground water and soil. Alternative #5 present worth cost is $35 M. The primary components are hotspot removal, soil washing, and bioremediation of ground water. Alternative #6A's present worth cost is $47 M. The primary components are hotspot removal on-site soil incineration and bioremediation ground water. Alternative #6B's present worth cost is $89 M. The primary components are off-site soil incineration and bioremediation of ground water.

o Reduction in Toxicity, Mobility or Volume

Alternatives #1 and #2 do not offer reduction in toxicity, mobility or volume of contaminated materials except removal of immiscible product from ground water. All other alternatives will satisfy this criterion.

o Short Term Effectiveness

Alternatives #1 and #2 would not offer any short term effectiveness except for restricted use of the property through institutional controls. Alternatives #3 and #4 have the greatest short term effectiveness because remedial alternatives are less intrusive than Alternatives #5 and #6 plus they offer soil cover for dust control. Alternatives #5 and #6 indicate extensive wetlands disturbance which would be mitigated upon the completion of the remediation.

o Implementability

Alternative #1 and #2 are the simplest alternatives to implement from a technical standpoint since the passive recovery system is already in place. The operations associated with #3 and #4 offer a combination of well established, readily available construction methods and innovative technology which may require additional design coordination. Major limitation are associated with the implementation of Alternatives #5 and #6 due to the phases of remediation and the time required for each. Incinerators usually are not well received by the community and the approval process may delay the implementation of Alternative #6.

o EPA Acceptance

USEPA concurs with the preferred alternative described in the proposed plan.

o Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following the public meeting review of the public comments received on the RI/FS report and the Proposed Plan.

PREFERRED ALTERNATIVE

Based upon an evaluation of the various alternatives, DEPE and EPA recommend Alternative #4, (Treatment of Ground-water with Reinfiltration and Soil Bioremediation) as the proposed remedy for the L. E. Carpenter site.

Biological Treatment of extracted ground water and soils would involve the extraction of ground water followed by reintroduction to the subsurface soils. Isolated areas of metal and PCB contaminated soils will be removed and disposed of off-site. In situ treatment offers a potential of degradation of contaminants without the need for extensive excavation and disturbance. Active recovery and ground water capture will limit the migration of contaminated ground water. Soil and ground water contaminates will be reduced to meet the soil and ground water criteria described in this proposed plan and will be protective of both human health and the environment. This alternative offers minimal impacts to soil from site activity due to uninvasive activities except hotspot removal, thereby reducing the amount of airborne dust and noise disturbance to the surrounding community.

This alternative satisfies the remedial action objectives and the substantive requirements of CERCLA, as amended by SARA, the National Contingency Plan, and the amended ACO.

The preferred alternative achieves the ARARs more quickly, or as quickly, and at less cost than the other options. The preferred alternative will provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. DEPE and EPA believe that the preferred alternative will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The remedy also will meet the statutory preference for the use of treatment as a principal element.

The preferred alternative is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

GLOSSARY
Of Terms Used In the Proposed Plan

This glossary defines the technical terms used in this Proposed Plan. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management, and apply specifically to work performed under the Superfund program. Therefore, these terms may have other meanings when used in a different context.

Administrative Consent Order: A legal and enforceable agreement between EPA and the potentially responsible parties (PRPs). Under the terms of the Order, the PRPs agree to perform or pay for site studies or cleanup work. It also describes the oversight rules, responsibilities and enforcement options that the government may exercise in the event of non-compliance by the PRPs. This Order is signed by the PRPs and the government; it does not require approval by a judge.

Air stripping: A process whereby volatile organic chemicals are removed from contaminated material by forcing a stream of air through it in a pressurized vessel. The contaminants are evaporated into the air stream. The air may be further treated before it is released into the atmosphere.

Ambient air: Any unconfined part of the atmosphere. Refers to the air that may be inhaled by workers or residents in the vicinity of contaminated air sources.

Aquifer: An underground layer of rock, sand, or gravel capable of storing water within cracks and pore spaces, or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be tapped and used for drinking or other purposes. The water contained in the aquifer is called groundwater.

Backfill: To refill an excavated area with removed earth; or the material itself that is used to refill an excavated area.

Bioaccumulate: The process by which some contaminants or toxic chemicals gradually collect and increase in concentration in living tissue, such as in plants, animals, or humans as they breathe contaminated air, drink contaminated water, or eat contaminated food.

Bioremediation: A cleanup process using naturally occurring or specially cultivated microorganisms to digest contaminants naturally and break them down into nonhazardous components.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap is generally mounded or sloped so water will drain off.

Carbon adsorption/carbon treatment: A treatment system in which contaminants are removed from groundwater and surface water by forcing water through tanks containing activated carbon, a specially treated material that attracts and holds or retains contaminants.

Closure: The process by which a landfill stops accepting wastes and is shut down under federal or state guidelines that ensure the public and the environment is protected.

Containment: The process of enclosing or containing hazardous substances in a structure, typically in ponds and lagoons, to prevent the migration of contaminants into the environment.

Cooperative agreement: A contract between EPA and a state wherein the State agrees to manage or monitor certain site investigation and/or cleanup responsibilities and other activities on a cost-sharing basis.

Downgradient/downslope: A downward hydrologic slope that causes groundwater to move toward lower elevations.

Therefore, wells downgradient of a contaminated groundwater source are prone to receiving pollutants.

Effluent: Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Upgradient/Upslope: Upstream; an upward slope. Demarks areas that are higher than contaminated areas and, therefore, are not prone to contamination by the movement of polluted groundwater.

Vegetated Soil Cap: A cap constructed with graded soils and seed for vegetative growth to prevent erosion. ()see cap.)

Volatile Organic Compounds (VOCs): VOCs are made as secondary petrochemicals. They include light alcohols, acetone,trichloroethylene,perchloroethylene,dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasers, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and wide- spread industrial use, they are commonly found in soil and groundwater.

Watershed: The land area that drains into a stream or other water body.

Wetland: An area that is regularly saturated by surface or groundwater and, under normal circumstances, capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are non-tidal and freshwater. Coastal wetlands are an integral component of estuaries.

L. E. CARPENTER, INC.
Wharton, New Jersey

Risk Assessment Summary

Table 1 - Risk Estimates - Current Conditions

RECEPTOR	MEDIA EXPOSURE ROUTE	SOIL Ingestion Inhalation Dermal	SEDIMENTS Ingestion Dermal	SURFACE WATER Ingestion Dermal	FISH INGESTION
On-Site Worker	HI	11	NC	NC	NC
	CA	$8x10^{-4}$	NC	NC	NC
Trespasser	HI	2.1	NC	NC	NC
	CA	$2.6x10^{-5}$	NC	NC	NC
Wader/Swimmer	HI	NA	0.32	0.013	NC
	CA	NA	$7.9x10^{-6}$	$2.1x10^{-7}$	NC
Child/Adult	HI	NC	NC	NC	1.6
	CA	NC	NC	NC	$6.3x10^{-4}$

*Calculations are based at the upper 95% confidence limit
HI = Hazard Index (Noncarcinogenic)
CA = Cancer Risk (Carcinogenic)
NC = Not Calculated

Current Conditions are based on:
(a) no current groundwater use on-site

Table 2 - Risk Estimates - Future Conditions

RECEPTOR	MEDIA EXPOSURE ROUTE	SHALLOW GROUNDWATER Ingestion Inhalation Dermal	INTERMEDIATE GROUNDWATER Ingestion Inhalation Dermal	DEEP GROUNDWATER Ingestion Inhalation Dermal	SOIL	SEDIMENTS Ingestion Dermal	SURFACE WATER Ingestion Dermal	FISH INGESTION
Hypothetical Future	HI	413	4.4	6.2	79	.32	.013	1.6
Resident	CA	$1.5x10^{-2}$	$1.3x10^{-4}$	$4.0x10^{-4}$	$1.9x10^{-3}$	$7.9x10^{-6}$	$2.1x10^{-7}$	$6.3x10^{-4}$

Future Conditions are based on:
(b) assumptions of future groundwater use on-site at levels comparable to overall site groundwater quality